BINMASTER®

Taking Control . . .To A Higher Level

MODEL DD1000

DUST DETECT

INSTALLATION AND OPERATING INSTRUCTIONS
READ THOROUGHLY BEFORE INSTALLING

BINMASTER®

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INTRODUCTION

The DD1000 is a single piece dust detector that has been specifically designed to be easily set up to monitor particulate emissions from small stacks and emission points. The DD1000 is able to recognize abnormal operation of the plant and is able to initiate alarms when changes in emissions exceed user-defined limits.

The DD1000 utilizes turboelectric technology whereby the collision and interaction of particles with the probe rod causes a small electrical charge transfer to occur between the particulate and the probe rod. This small electrical charge provides the signal that is monitored by the electronics. If the material type remains constant, the signal generated is proportional to the dust concentration even if an accumulation of dust forms on the sensor rod.

INSTALLATION & MOUNTING OF DD1000

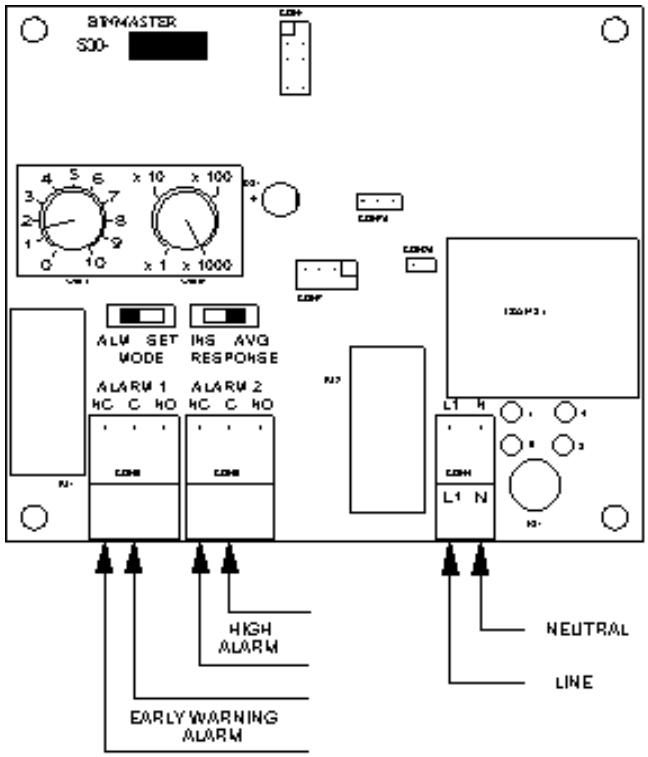
The best position for the DD1000 is a section of ductwork where the particulate has an even distribution and the flow is linear. This would ideally be in a vertical or horizontal section of duct, having no bends or obstructions for at least three duct diameters downstream and upstream. In many applications, a compromise must be made, and the sensor would be fitted in a position, which satisfies the majority of the above requirements. The DD1000 must be mounted to **metal ductwork** in order to be electrically shielded from interference signals. The DD1000 should not be mounted in direct sunlight or in areas where the ambient temperature may exceed -40° to +160°F. If you require further advice on any installation aspects, please consult BinMaster.The DD1000 comes with both 1 ¼" NPT or ¾" NPT male threads for mounting purposes. A sanitary fitting is also available which can provide for quick disconnect and removal.

WIRING OF POWER AND RELAY CIRCUITS

The DD1000 is powered from 115 VAC 50/60 Hz at 3VA. The ungrounded line conductor is connected to terminal L1 of CON4 and the neutral conductor is connected to terminal N ot CONN4. The equipment grounding conductor must be connected to the green ground screw provided in the enclosure. Wiring to the unit should comply with the National Electrical Code and local codes.

Two SPDT relays are provided for operations of auxillary alarms and controls at user discretion. Alarm 1 relay is the Early Warning ouput and Alarm 2 relay is the failure alarm output. The relay contacts are rated for 10A at 250 VAC or 30 VDC.

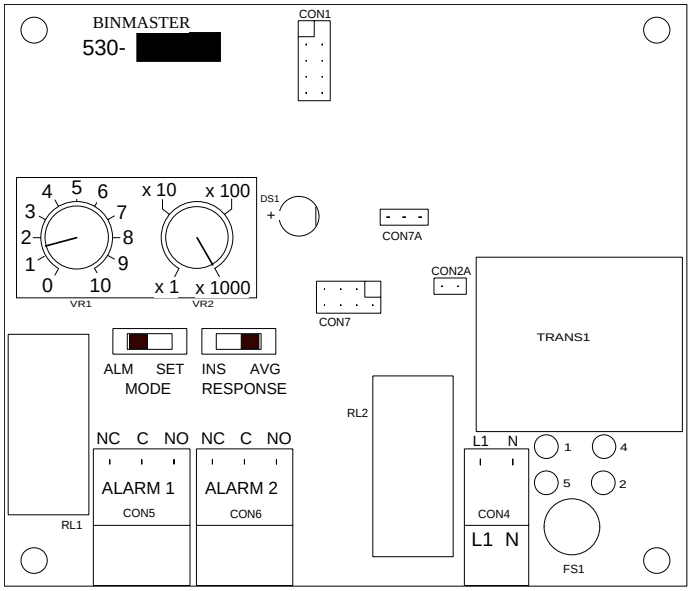
Figure 1



SETUP PROCEDURE

The DD1000 is setup using the two potentiometers and two slide switches on the main circuit board. (See Figure 2).

Figure 2



There are five main steps involved in setting-up the DD1000, they are:

Note: If you do not wish to trigger an external alarm while setting the DD1000, you should disconnect any connections from the ALARM relay terminals CON5 AND CON6 by unplugging the terminal plugs.

Step 1 Before applying power, set both Alarm Level potentiometers to full clockwise. Set the **MODE** switch to **ALM** and the **RESPONSE** switch to **AVG**. Now apply power to the DD1000.

After an initial delay of approximately 2 seconds, the Alarm status **LED DS1** will go to a steady state illumination. The color of the **LED** can be either steady green or red at this point. If the **LED** does not go to a steady color but continues to flash orange after 5 seconds, then disconnect power to the unit, wait 1 full minute and then apply power again.

Step 2 The purpose of this step is to capture some reference dust level information from the plant. It is essential that the plant is running normally during this time (i.e. not during the start-up phase and with bag cleaning operating where appropriate.)

To begin collecting information, set the **MODE** switch to **SET**. The Alarm Status LED will flash green to indicate that data is being collected. The data collection process will last as long as you allow (up to a maximum of two hours). In general, a longer collection period will provide a closer representation of normal plant activity. Typically, 15 minutes will be sufficient to provide a good representation.
NOTE: If the DD1000 is to be referenced against an iso-kinetic sample, the collection period will be the length of the sample run.

Step 3 The purpose of this step is to use the DD1000 control potentiometers to determine the dust level from the information stored during the collection period of step 2.

Slowly rotate the multiplier potentiometer (the one labeled X1, X10, X100, X1000) counter-clockwise. At some point, the Alarm Status LED will change from flashing green to flashing red. At this point, slowly rotate the multiplier potentiometer back clockwise to the nearest scale marker. The Alarm Status LED should return to flashing green. Now slowly rotate the units potentiometer (the one labeled 0 to 10) counter-clockwise until the Alarm Status LED changes from flashing green to flashing red. Now move the **MODE** switch back to the **ALM** position.

It is now possible to read the dust level. The dust level is found by reading the scale position of the units potentiometer and multiplying it by the scale position of the multiplier potentiometer. This dust level corresponds to the normal operation of the plant and may be referenced to an iso-kinetic test if required.

NOTE: If it is not possible to make the LED change to flashing green, the sensitivity will need to be reduced by moving the jumper on CON2a to connect both pins together.

Step 4 The purpose of this step is to set the alarm levels based upon the dust level found in step 3. First, it will be necessary to decide the level at which the High alarm (relay 2) is to be triggered. This will depend upon the type of plant and the local authority recommendations.

When a High alarm level has been decided upon, the DD1000 may be programmed to this value by adjusting the settings of the units and the multiplier potentiometers. Divide the desired alarm level value by 1, 10, 100, or 1000 to give a number between 0 and 10. Rotate the unit's potentiometer to this new value. Rotate the multiplier potentiometer to the number you divided by to get the setting for the unit's potentiometer (i.e. 1, 10, 100, or 1000).

For example, if the desired alarm level is 1500 units, you would divide this value by 1000 to give 1.5. The unit's potentiometer would then be set to 1.5 and the multiplier potentiometer would be set to x1000.

The Early Warning alarm (alarm 1) will be triggered at HALF of the value set for alarm 2. In the above example this equates to 1500/2 = 750 units. Care must be taken to ensure that the High alarm level is set to more than TWICE the normal plant dust level otherwise relay 1 will always be in alarm.

Step 5 The purpose of this step is to set the alarm response to the desired setting. The Alarm Response of the DD1000 can be set to a **time averaging mode** by setting the **RESPONSE** switch to the **AVG** position or to an **instant mode** by setting the **RESPONSE** switch to the **INS** position.

When the **RESPONSE** switch is in the **AVG** position, the DD1000 will average the dust level for two consecutive 30 second time intervals. If the average dust level for both 30 second time periods is greater that the set High alarm level, then the High Alarm will be triggered. Both relays 1 and 2 will de-energize and the LED will turn steady RED. If the average dust level for both 30 second time periods is greater that HALF of the set High alarm level, then the Early Warning Alarm (alarm1) will be de-energized and the LED will turn ORANGE. The DD1000 alarms will stay triggered until the average dust level for a 30-second interval falls below the respective trigger level for each alarm.

When the **RESPONSE** switch is in the **INS** position, The DD1000 will trigger the appropriate alarm immediately whenever the dust exceeds the set alarm level. Likewise, the alarm will cease immediately whenever the dust level is below the set alarm level.

If you are uncertain about which alarm response you should use, then it is recommended to use the averaging mode (**AVG**) to lessen the possibility of false triggering of the alarms.

At this point, the set-up procedure has been completed. Reconnect the terminal headers for CON5 AND CON6. If you do not have the 4-20mA option, you may replace the enclosure cover and secure it in place with the cover bolts.

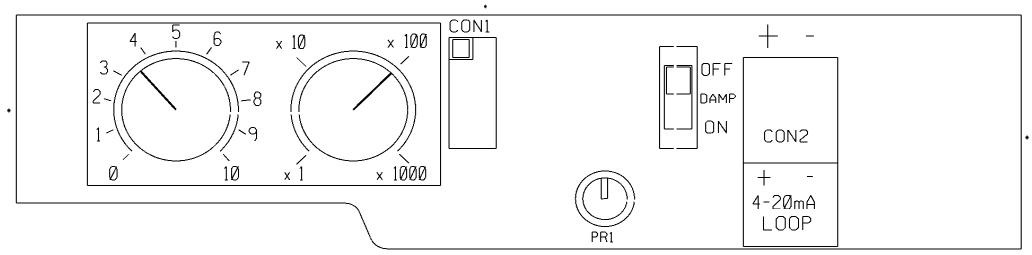
4 to 20mA OUTPUT OPTION

The DD1000 can be equipped with an optional 4 to 20mA output. This output provides a current related to the actual dust level being detected by the DD1000. The 4 to 20mA is an isolated output that can drive a maximum loop resistance of 600 ohms. A twisted pair cable of at least 22 AWG wire should be used to connect to the receiving instrument. Take care to observe output polarity.4 to 20mA SETUP

For setup and real time output of the 4-20mA loop, place the damping switch in the OFF position.

The 4 to 20mA PC board uses the unit and the multiplier potentiometers to set up the full scale output of the 4 to 20mA loop. (See Figure 3). These potentiometers work just like the units and multiplier potentiometers on the DD1000 main board. Use the normal dust level value determined during set up of the DD1000 to set up the full-scale output of the 4 to 20mA loop. The 20mA or 100% output would be set to some multiple of the normal dust level, typically the same as the High alarm level was set to. To accomplish this, simply set the potentiometers on the 4 to 20mA board the same as those on the Main DD1000 board.

Figure 3



***When the 4 to 20mA output is used to drive devices that you do not want to be constantly fluctuating, the DAMPING switch on the 4 to 20mA board can be put in the ON position. With the DAMPING switch in the ON position, the output will be a steady level that is continuously updated at regular time intervals, typically less than a minute. This is suitable for devices such as chart recorders that would then show timed step changes at short intervals rather than constantly fluctuating indications*.**

FCC COMPLIANCE

CAUTION: This device has been verified to comply with FCC Part 15. Changes or modifications not expressly approved by Garner Industries for compliance could void the user's authority to operate the equipment*.*

SUMMERIZED SETUP PROCEDURE

(PLANT PROCESS MUST BE RUNNING AT NORMAL DUST LEVEL)

DISCONNECT RELAY OUTPUTS TO PREVENT FALSE ALARMS

DISCONNECT POWER FOR AT LEAST ONE MINUTE

SET CONTROLS AS FOLLOWS:
BOTH **ALARM CONTROLS** FULL CLOCKWISE
MODE SWITCH TO **ALM**
RESPONSE SWITCH TO **AVG**

RECONNECT POWER
OBSERVE THAT THE LED GOES TO A STEADY COLOR.

MOVE THE **MODE** SWITCH TO THE **SET** POSITION
LED SHOULD FLASH GREEN
WAIT DESIRED TIME FOR COLLECTING REFERENCE DATA

SLOWLY ROTATE THE **MULTIPLIER CONTROL** COUNTER CLOCKWISE TO THE POINT WHERE THE LED CHANGES TO FLASHING RED, THEN TURN IT BACK CLOCKWISE TO THE NEXT CLOSEST MARKING. THE LED SHOULD AGAIN BE FLASHING GREEN.

SLOWLY ROTATE THE **UNITS CONTROL** COUNTER CLOCKWISE TO THE POINT WHERE THE LED CHANGES TO FLASHING RED. THIS IS THE NORMAL RELATIVE DUST LEVEL AS READ BY THE UNITS NUMBER MULTIPLIED BY THE MULTIPLIER CONTROL VALUE.

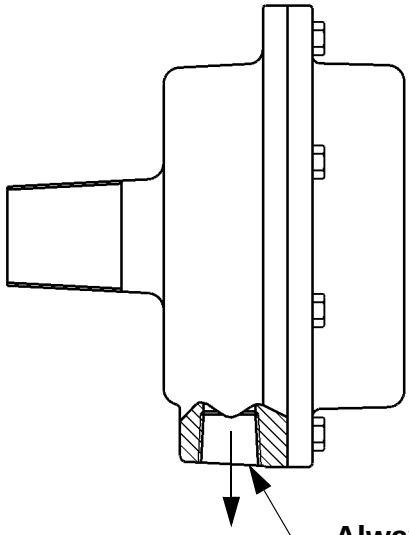
MOVE THE **MODE** SWITCH TO THE **ALM** POSITION.

USING THE **UNITS** AND **MULTIPLIER CONTROLS**, DIAL IN THE DESIRED ALARM 2 LEVEL. THIS SHOULD BE AT LEAST 3 TIMES GREATER THAN THE NORMAL DUST REFERENCE LEVEL SINCE THE ALARM 1 LEVEL IS HALF OF THE ALARM 2 VALUE.

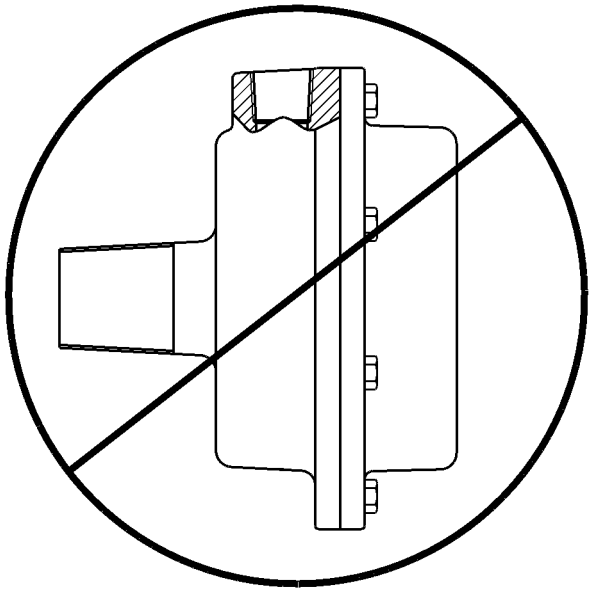
SET THE **RESPONSE SWITCH** TO **AVG** (AVERAGE) OR **INS** (INSTANTANEOUS) AS DESIRED.

RECONNECT THE RELAY ALARM WIRING IF IT WAS PREVIOUSLY DISCONNECTED.

Mounting Instructions



Always Mount Unit with Conduit Opening Down



CONDUIT SEAL

When installing this level indicator in environments where it is possible for moisture or moist air to enter the enclosure thru the electrical conduit, the conduit opening should be sealed with a duct seal compound or putty appropriate for the purpose.

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